

Highly Efficient, Durable Regenerative Solid Oxide Stack, Phase I

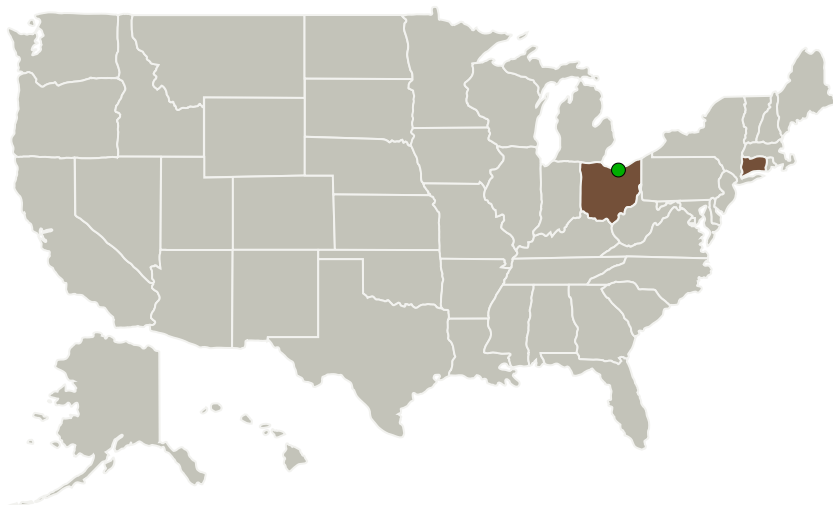
Completed Technology Project (2017 - 2017)




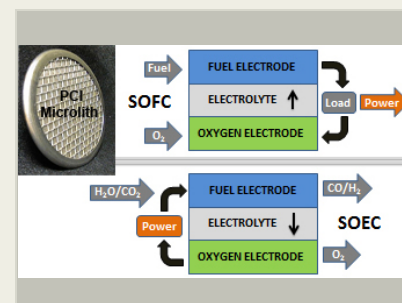
Project Introduction

Precision Combustion, Inc. (PCI) proposes to develop a highly efficient regenerative solid oxide stack design. Novel structural elements allow direct internal reforming of regolith off-gases (e.g., methane and high hydrocarbons) within a solid oxide stack as well as efficient H₂O/CO₂ electrolysis, overcoming shortcomings of traditional approaches. The resulting enhanced heat transfer design offers the potential for light-weight and simple design with high efficiency and durability. This effort would be valuable to NASA as it would significantly reduce the known spacecraft technical risks and increase mission capability/durability/efficiency while at the same time increasing the TRL of the solid oxide systems for ISRU application. Technology concept of highly-efficient regenerative Solid Oxide Stack will be demonstrated in Phase I with a clear path towards Phase II breadboard demonstration.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Precision Combustion, Inc.	Lead Organization	Industry	North Haven, Connecticut
 Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



Highly Efficient, Durable Regenerative Solid Oxide Stack, Phase I Briefing Chart Image

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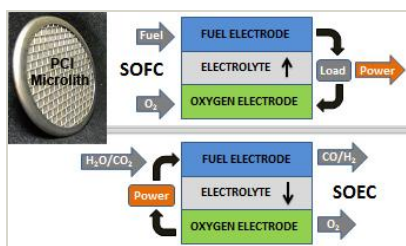
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Primary U.S. Work Locations

Connecticut

Ohio

Images



Briefing Chart Image

Highly Efficient, Durable
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Phase I Briefing Chart Image
(<https://techport.nasa.gov/image/128019>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Precision Combustion, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

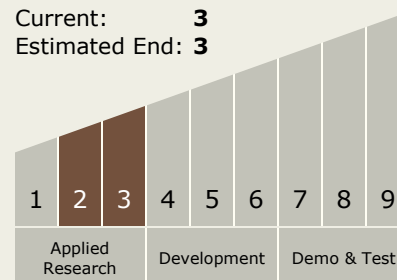
Carlos Torrez

Principal Investigator:

Saurabh Vilekar

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.2 Energy Storage
 - └ TX03.2.2 Electrochemical: Fuel Cells